

# PATENT ABSTRACTS OF JAPAN

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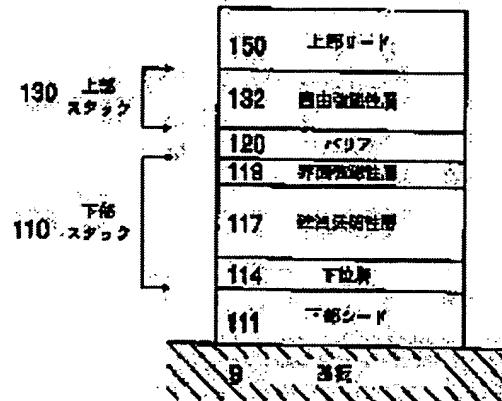
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**(54) MAGNETIC TUNNEL JUNCTION ELEMENT, JUNCTION MEMORY- CELL AND JUNCTION MAGNETIC FIELD SENSOR**

**(57)Abstract:**

**PROBLEM TO BE SOLVED:** To provide the element having high magnetic reluctance with a zero magnetic field by forming the element having a multilayered structure and a substrate formed with an insulating tunnel layer capable of passing a tunnel current in nearly a perpendicular direction to a free ferromagnetic layer and the free ferromagnetic layer.

**SOLUTION:** A lower electrode 110 includes a boundary layer 114 consisting of Cr and the multilayered structure acting as a fixed ferromagnetic layer. The multilayered structure is formed of two layers; a hard ferromagnetic layer 117 having large coercive force and a thin boundary ferromagnetic layer 119. An upper electrode 130 formed on an alumina tunnel barrier layer 120 is Ni40Fe60 or Co single layer usable as the free ferromagnetic layer 132. An electric lead layer 150 consisting of Al is formed on the free layer 132 consisting of Co without using a protective layer. The boundary ferromagnetic layer 119 exists at the boundary between the hard ferromagnetic layer 117 and the tunnel barrier 120. The boundary layer 119 is formed by using Co, Co-Fe alloy, Ni-Fe alloy, etc., and is so selected as to generate a powerful spin filter effect.



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